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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/446,144

03/02/2000

CARLO RUBBIA

218728-0059

1854

51500 7590 09/15/2009
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EXAMINER

GREENE, DANIEL LAWSON

ART UNIT

PAPER NUMBER

3694

MAIL DATE

DELIVERY MODE

09/15/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/446,144	Applicant(s) RUBBIA, CARLO	
	Examiner DANIEL L. GREENE JR.	Art Unit 3694	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17, 19-22 and 24-48 is/are pending in the application.
- 4a) Of the above claim(s) 10, 11, 13-16, 26, 27, 29, 30 and 33-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17, 19-22, 24, 25, 28, 31 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's response received 6/10/2009 is acknowledged. In said response applicant requested a continuation of examination, canceled claims 1-16, amended claim 17 and argues against the contentions set forth in the previous Office action mailed 12/10/2008. Claims 17, 19-22 and 24-48 are currently pending with claims 10, 11, 13-16, 26, 27, 29, 30 and 33-48 being previously withdrawn. Accordingly an action on the merits of claims 17, 19-22, 24, 25, 28, and 31-32 follows.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of said previous Office action mailed 12/10/2008 has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/10/2009 has been entered.

Response to Arguments

3. Applicant's arguments filed 6/10/2009 have been fully considered and some are persuasive and some are not as expounded upon more fully below.

a. The arguments, set forth on pages 10-13, against the 35 USC 101 double patenting rejection set forth on page 13, section 9 of said previous Office action are persuasive. Accordingly, said rejection is hereby withdrawn.

- b. The arguments, set forth on page 13, against the 35 USC 101 double patenting rejection set forth on page 13, section 10 of said previous Office action are persuasive. Accordingly, said rejection is hereby withdrawn.
- c. The arguments set forth on pages 13-15 against the 35 USC 102 rejection set forth in section 11 of said previous Office action have been considered and they are persuasive. Applicant's arguments are persuasive because it does not appear that Bowman explicitly states that the "molten salt" contains lead and/or bismuth. Accordingly, said rejection is hereby withdrawn. However upon further review and consideration of the Bowman reference the rejection has been converted to a 35 USC 103 rejection as set forth more fully below.
- d. The arguments set forth on pages 15-17 against the 35 USC 102 rejection set forth in section 12 of said previous Office action have been considered and they are persuasive for similar reasons set forth in section 6 above. Accordingly, said rejection is hereby withdrawn. However upon further consideration this rejection has also been converted to a 35 USC 103 rejection as set forth more fully below.
4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

5. Claims 17, 19-21, 24, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,160,696 to Bowman.

. **Regarding claims 17 and 28**, Bowman discloses applicant's invention as set forth and explained in, for example, section 11 of the previous Office action mailed 12/101/2008.

Bowman Figure 4 and associated text discloses a lead-bismuth molten salt target (84) (Col. 8, lines 12-16) AND a Molten Salt recirculation loop (94) (Col. 11, line 12-Col. 12, line 60). Bowman appears to disclose "proposed" molten salt eutectics in, for example, Col. 11 lines 37-44. However Bowman gives examples only and clearly articulates that the "proposed compositions...might be..." and "An alternative composition might be..." Bowman does not appear to explicitly disclose **each, every and all** molten salt eutectics that would work and satisfy the requirements of the invention.

Bowman clearly discloses that Lead-Bismuth (PbBi) is a molten salt eutectic. Accordingly, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use Pb-Bi as the molten salt in the molten salt circulation loop 94. One would be motivated to use Pb-bi for the same reasons it is used in the primary loop. One would also be motivated to use Pb-Bi in the molten salt circulation loop 94 for the purposes of maintaining uniformity in the coolants used. That is, using the same coolant throughout a system minimizes the number of different coolants required and each of

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their specific associated costs, handling procedures and interactions with other materials within the system itself, i.e. simplicity.

Bowman is clearly directed towards producing a useful short-lived radioisotope for industrial applications and recovering said useful radioisotope from the exposed material for use in industrial applications in, for example, Figure 4 and associated text wherein it is understood that processor (48) is removing the short-lived radioisotopes. These short lived isotopes are industrially useful because they have a shorter half life than their original precursor.

Regarding claims 19 and 21, Bowman clearly discloses providing a neutron moderator (deuterated water) around the activation region where the exposed material is distributed in for example, figures 2 and 4, item 44 and associated text.

Regarding claim 20, Bowman clearly discloses providing a second buffer region, made of said heavy elements free of the exposed material, located between the moderator (44) and the activation region where the exposed material is distributed in, for example, figures 2 and 4 wherein it is understood that during startup, when the molten salt circulation through recirculation loop 94 has not been mixed with isotopes for transmutation. That is, the Pb-Bi salt in said loop 94 acts in the same manner as in applicant's invention. Accordingly that Pb-Bi salt material located between containment means 98 and moderator 44 reads on a second buffer region.

Regarding claims 24 and 28, see for example, Col. 11 lines 1+, Figures 2 and 4 and associated text, etc.

Regarding claim 25, See fig 4 and corresponding text description (See, for example, col. 11 lines 1+)

While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

6. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,442,226 B1 to Venneri et al. (Venneri).

Regarding claim 17, Venneri sets forth applicants invention as claimed and explained in section 12 of said previous Office action. Venneri, clearly discloses producing useful short lived radioisotopes for industrial applications (i.e. reducing the half life of fission products) and recovering said useful radioisotopes from the exposed material in, for example, Fig.1, item (24), Fig. 4, Fig. 8, and associated texts found in, for example, Col. 8, lines 34-63, Columns 9 and 10 (Reductive Extraction), etc.

Venneri does not appear to explicitly disclose that the “molten salt” (item 24 in Figure 1) is made of heavy elements including at least one of lead and/or bismuth.

Venneri teaches the use of various constituent elements of the “molten salt multiplying assembly” throughout the disclosure including lead, bismuth, etc. See, for example, Col. 10 lines 18+, etc.

At the time of the invention it would have been obvious to one of ordinary skill in the art to utilize any combination of the various elements taught by Venneri as well as

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any of those that are well known in the nuclear power field to be the constituent elements of the "molten salt". One would be motivated to add or subtract different elements from the "molten salt" for the purpose of minimizing corrosion, extracting useful elements or compounds, filtration, etc. As such, it would have been obvious to have lead and or bismuth within the "molten salt".

It is noted that the claim language states:

"providing an activation region around the first buffer region, said activation region being made of heavy elements including one of lead and/or bismuth;"

As such, other elements may reside within the activation region. The limitation "being made of heavy elements, including one of lead and/or bismuth" is neither utterly inclusive nor exclusive of ANY elements as the term "heavy" is a relative term. That is, the claim does not require the activation region to be made completely out of lead and/or bismuth; merely include lead or bismuth in the activation region which is "made of heavy elements".

Regarding claim 19, see for example, item 26 in Figure 1, item 34 in Figure 9, etc.

7. Claims 6, 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowman ('696) as applied to claims 17, 19-21, 24, 25 and 28 above and further in view of Borst (3,197,375) for the reasons set forth in section 18 of the previous office action mailed 12/10/2008.

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8. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowman ('696) as applied to claims 17, 19-21, 24, 25 and 28 above and further in view of Ruddock (4,123,497) for the reasons set forth in section 19 of the previous office action mailed 12/10/2008.

9. Claims 1 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,160,696 to Bowman in view of US 6,442,226 to Venneri for the reasons set forth in section 16 of the previous office action mailed 12/10 which in turn refers back to the reasons set forth in section 20 of the previous office action mailed 4/15/2008.

See the prosecution history for the plethora motivations to include lead and/or bismuth in the activation regions for the benefits taught by both Bowman and Venneri.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL L. GREENE JR. whose telephone number is (571)272-6876. The examiner can normally be reached on Mon-Thur.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James P. Trammell can be reached on (571) 272-6712. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. L. G./

Examiner, Art Unit 3694

2009-09-09

/James P Trammell/

Supervisory Patent Examiner, Art Unit 3694